The Glass Industry
REG. U. S. PAT. OFF.

Vol. 14 OCTOBER, 1933 No. 10

Blowing Glass Containers For Varied Purposes

New Jersey Plant Specializes in Decorated Bottles and Containers of Diversified Form and Coloring

By R. G. Skerrett

NEARLY two billion glass containers are blown or pressed annually for marketing medicinal and toilet preparations. This output has a normal factory value of approximately $33,000,000. These figures cover only one branch of the bottle-making industry, and yet both the volume of the commodity and the money equivalent are truly large.

Proprietary medicinal and toilet preparations would, if enumerated, form an imposing as well as an astonishing list; and the sum total of certain of these is increasing annually because of the rapidly augmenting demand for "beauty aids." How really beneficial these products are need not concern the manufacturer of glass containers. His primary interest lies in making a satisfactory article—one that will serve the specific purpose in each case and, by reason of form, color, or decoration contribute just so much to the marketing of the packaged commodity.

The appeal to the eye has a sales value, and the maker of the medicinal or the toilet preparation capitalizes this fact. The effort to achieve this is notably marked in those so-called toilet preparations that are sold competitively; and each manufacturer strives to arrest attention by a distinctive package which may be used year after year or which may be changed oftener if that should prove advantageous. The lure of a foreign name and the reputation of an alien producer have their selling value; and to lessen import charges and to place many of these foreign commodities on the market at acceptable prices to American consumers, the preparations are shipped into the country in bulk and packaged here —the characteristic containers being turned out by domestic plants. This has led to the upbuilding of a very considerable business in the making of special glass containers for pharmaceutical, toilet, and allied commodities for ultimate sale by retail.

To most of us, glass containers of the sort under consideration are just glass—shaped, colored, or otherwise finished as may be called for by the different departments of the trade; and the popular assumption is that fundamentally this lays no particular burden upon the manufacturer. While glass is glass, still it may vary widely in composition; and the glass that will answer satisfactorily for a container of one fluid or preparation will not serve to hold properly some other substance. No glass container is an acceptable one if the glass lead to the impairment of the commodity placed in contact with it. How many of us are aware that glass is soluble at normal temperatures in the presence of a generally reputed harmless or impotent fluid? Surprising as it may seem, rain water or distilled water when placed in a lime-glass bottle will induce signs of decomposition of the glass in so brief an interval as twenty-four hours! While lime glass will answer admirably for the making of bottles for a great many uses, still glass of that sort will not do if the containers are to be filled with any one of a considerable number of commonly marketed chemicals and therapeutic preparations. Sooner or later the bottled commodities will attack the glass, set free the lime content of the glass, and from then on reactions will occur that will damage or weaken the contents. So much for conditions that have to be met by the fully qualified manufacturer of glass containers. Now let us describe the activities within the plant of a long established concern that is generally acknowledged to be the greatest producer of decorated bottles and glass containers in this country. We refer to the establishment of the T. C. Wheaton Company, at Millville, N. J.

As is probably common knowledge among the readers of this magazine, Millville is in the southern section of New Jersey and in the heart of that area that has been engaged in the manufacture of glass since early colonial days. For

many years after it was started, the industry flourished in that part of New Jersey because native resources contributed essential raw materials. Good sand was to be had in plenty; the oyster beds supplied shells that yielded the needed lime; virgin stands of timber provided fuel for the pot furnaces; and the wood ashes carried the potash required in the making of glass. Indeed, the manufacture of glass is a hereditary industry in southern New Jersey; and even during the years of the industry's temporary decline, the art of glass-making remained familiar to many of the people, and trained workers were available when the time came for a revival.

Such was the situation in the late "eighties" when a group of enterprising citizens of Millville decided that the town was ripe for an industrial development—the only question was the kind of industry to be promoted; and the creation of a glass plant was virtually the unanimous choice. Then and there the T. C. Wheaton Company was organized. At that date, there were other glass works in the State that were engaged in blowing great numbers of bottles for general purposes, and, therefore, the T. C. Wheaton Company sagely decided to confine its activities to producing bottles for exceptional or special uses. That policy has been consistently held to ever since, and it is interesting to recall that one of the products that has helped to make the firm very widely known is its line of nursing bottles. Innumerable infants have drawn their essential nourishments from this Wheaton specialty, and, no doubt, the youngsters have been healthier and happier and their parents correspondingly pleased because of the way these containers have filled an elemental infantile need. In the years that have intervened the specialties have multiplied and the list of customers seeking containers for their particular requirements has grown steadily longer and longer.

In most glass plants where volume of output means much in the annual business, semi-automatic or automatic bottle-blowing apparatus has been adopted, thus reducing the operating force in comparison with the total production. Although essentially modern, the T. C. Wheaton Company blows all its bottles by hand, and finds this procedure to be the most economical one for the conditions under which it works. This is understandable when it is recalled that the containers are greatly diversified; and with the highly trained personnel available the establishment is able to produce widely varying quantities at lower cost by hand than would be possible if frequent adjustments or changes had to be made to turn out the products by machine. The bottles blown range in capacity from a maximum of five gallons down to wee ones only large enough to hold one-eighth of a fluid ounce, according to apothecary's measure. Not only that, but these containers differ greatly in other respects—such as color, shape, and finish. Furthermore, the company has evolved what is known to the trade as "Nosolvit", an alkali-free glass that is especially suitable for containers designed to protect certain biochemical preparations and other fluids that must ordinarily be held in bottles for a more or less protracted period while in transit or in storage and likely to be subjected to somewhat wide variations in temperature.

Top—In the cutting and polishing department where expert operators do the necessary finishing with the aid of grindstones.

Center—To make glass stoppers alcohol tight both the stopper and the interior neck of a bottle are ground to a fit with emery wheels.

Lower—Spraying the colored coat on cold-cream jars preparatory to burning the color on.

This glass is a distinct advance in the art and guards against the drawbacks or objectionable reactions characteristic of lime glass under some conditions. There are a number of biochemical preparations now extensively used in either safeguarding against disease or battling with disease; and it is, therefore, vitally important that the glass of a container should not impair the preventive or the therapeutic qualities of the medicinal fluid or substance.

Apart from bottles of the common sorts, the T. C. Wheaton Company produces atomizer bottles, perfume bottles, and bottles for various toilet specialties. Furthermore, the company makes jars for cold creams, salves, and numerous preparations for the protection and treatment of the skin. In lesser measure, it makes glass knobs of antique designs for furniture and doors, and it also produces lamp stands and different kinds of allied house furnishings. In many of these commodities, colors are employed to meet the present-day taste, and wares of a wide range of hues are characteristic of the plant. As is usual in the industry, the coloring matter is an ingredient in the molten glass in many cases while in others it is applied to the ware after the article is formed, and then made permanent by burning in a furnace. The colored coating is sprayed on in a fluid condition, and at that time it produces an opaque film—often quite unlike what it will be when burned and rendered transparent. Atomizers, operated with compressed air, do the spraying, and the after-effect, which may be unusual, depends upon the skill of the worker in distributing the frit of the vitreous enamel.

Originally, the factory boasted a single pot furnace, and that furnace was set in the middle of a bare tract having an expanse of an acre and a half. The plant now is distributed over an area of twenty acres, and it contains two modern pot furnaces and no fewer than four tanks for the continuous melting of glass. The pot furnaces, of course, make it practicable to melt glasses of different colors and characteristics in quantities to meet as many diverse requirements—thus affording the necessary flexibility in meeting a variety of orders. On the other hand, the tanks provide much larger quantities of glass of a given kind for the production of what might be termed bulk commodities.

One of the pot furnaces and all the tank furnaces are fired with air-sprayed fuel oil; and the annealing furnaces or lehrs are similarly heated. This permits a nice control of temperatures. The numerous small furnaces or glory holes, where many of the forming bottles are reheated before their necks are finished are likewise oil-and-air fired. The decorating lehr, where the coated wares are burned, is heated with air-sprayed fuel oil.

The various sizes of so-called small bottles are blown by hand in hinged iron molds made up of two parts. The workmen are grouped into "shops"—a shop consisting of seven persons—three skilled men and four unskilled ones who perform certain associate services. To be specific: One man gathers from the furnace, from a given pot, just so much glass on the end of a blow pipe and then hands the "iron" to a second man, who rolls the plastic and glowing glass on a plate or marver—giving the glass a somewhat conical form. With that done, the still plastic glass is lowered into a mold, the mold is closed by an attendant, and the blower blows down through his tube and causes the glass to expand like a growing bubble and then to press against and conform to the walls of the mold. When this operation is completed, the partly modeled bottle is removed from the mold—which is opened for the purpose—and carried by a helper to a convenient glory hole for reheating. When hot enough for further working, the pipe, with the partly made body, is removed from the glory hole and turned over to a worker who forms the neck. The next operation is to break the bottle free from the pipe—which calls for skill lest the bottle be damaged; and then the container is carried to an annealing furnace and exposed there to a gradually diminishing temperature that ranges from 1,000° F. to that but little higher than that of the atmosphere at the discharge end of the lehr. The containers remain for different periods in the annealing furnace, as they move from the admission to the exit end of the furnace—the time being determined by the size and weight of the container, which prescribe how long it will take to remove the initial stresses set up in the glass body when solidified.

For some purposes, the bottles are provided with glass stoppers: Assuming this to be the case with those that are to hold perfume, let us say, then the bottles, after inspection, are sent to the cutting and polishing department of the plant, and there all mold marks and sharp edges are removed and the containers are polished on sandstone disks. With these operations completed, the bottles are transferred to the stopper-grinding department. There the mouth of each container is ground with emery so that the glass stopper, when inserted, will fit alcohol tight. Each bottle, with its particular stopper represents a separate job, and the work must be performed with skill and exactness.

Let us assume that the container is to be colored externally. That being the case, it is delivered to the decorating department where the prescribed color is applied by spraying. Perhaps the decoration is to be limited to some propriety symbol, design, or name, and if such be the case the design or lettering is stamped on the glass. As before mentioned, the coating or other embellishment is made permanent and transparent by burning. Should the demand be for frosted containers, this finish is obtained by dipping the bottles into hydrofluoric acid, which attacks the exposed surface and produces the effect commonly described by the term "ground glass." Perhaps the bottles are to be given a crackle finish—one that is pleasingly effective when a colored fluid is placed in the containers. The crackle is obtained by first heating the bottles to a suitable temperature and then dipping them quickly into water. Needless to say, the temperatures of the bottles and the water must be just right; and an unskillful workman might easily cause the crackle to be so deep as to weaken the containers and possibly induce the fracturing of some of them. A subsequent heat treatment reunites measurably the multiple fractures without destroying the wished-for effect, and in this way the bottles are given their prescribed strength.

What has been said about the blowing of small bottles applies broadly to the making of five-gallon carboys, which are extensively utilized in watercoolers; but there are some

differences in the procedure. First, the gatherer progressively builds up and rolls into shape on his marver enough glass from which to blow a five gallon bottle, and then, with the glass hot and plastic, he blows just hard enough into his pipe to create a small cavity or bubble in the glass. He next increases the size of this cavity by substituting a hose linked with the plant's compressed air line, and this air does what it would be very difficult for his lungs to do. At this stage the glass has cooled and stiffened, and the embryo bottle goes into a convenient glory hole for reheating. When the glass is hot enough, it is again worked on an iron table, in a pit, with the blow pipe held upright and rotating the while. In this manner, the bottom of the bottle is given its initial form; and at the right moment the big bubble is placed in a heavy two-part mold of iron, and compressed air is blown down through the pipe to distend the glass so that it will conform to the interior surfaces of the mold.

To "set" the glass so that it will hold its shape, compressed air is blown upon it immediately after the body of the bottle is withdrawn from the mold—its large mass tending to hold its heat and to remain somewhat plastic after leaving the mold. When cooled to the desired rigidity, the developing bottle is reheated in a glory hole and made ready for the forming of the neck. When again plastic, the neck of the bottle is produced by revolving the attached blow pipe and by gripping the mass with hand-finishing tools that shape the neck. With most of the neck fashioned in this manner, the bottle is skillfully detached by the blower from the rest of the glass that still adheres to the blow pipe, and the lip of the neck is then modeled as a concluding operation. The completed carboy is next placed in the annealing furnace where its journey from intake to outlet is longer than is the case with the bottles of much smaller sizes.

Although it produces its wares by hand, still the T. C. Wheaton Company uses compressed air instead of the human lungs for many purposes and also for services that the lungs could not possibly perform. Accordingly the compressor plant is a prime part of the mechanical equipment, and air under pressure is utilized continuously in one way or another every working day, and twenty-four hours a day. Like other up-to-date industrial enterprises, the management of the Millville factory seeks to cut costs wherever practicable, and it is to this end it depends mainly upon an oil-engine-driven compressor to furnish operating air 168 hours weekly. The substitution of this oil-engine unit for the four smaller units—driven respectively by steam and electricity, has netted worth-while economies; and the other machines are retained merely as standbys that have been utilized only for short runs at infrequent intervals during the overhaul or minor repair of the main source of compressed air. This mention of the oil-engine-driven compressor is for the purpose only of showing that the T. C. Wheaton Company moves forward with the march of mechanical progress in those departments where something is to be gained by doing so, but its principal reliance in turning out its many and superior kinds of glass containers is still placed upon the shoulders of its highly qualified hand-workers.

The bottle of perfume, the jar of cold cream, and any one of many other familiar glass containers to be found on the toilet table or tucked away in the medicine cabinet will henceforth have a new meaning to the ultimate possessor. Each and every one of them is the product of a number of precise operations and the exercise of a goodly measure of skill at every stage of production. Perhaps it is what it is because of the chemical nature of the contents, but perhaps its appeal to the eye is but one way of reaching your purse. In either case the glass-worker has done his bit to safeguard your purchase or to win your favor.

Corhart Electrocast

"The Story of Corhart Electrocast" is the title of the interesting booklet issued by The Corhart Refractories Company, Sixteenth and Lee Streets, Louisville, Kentucky, producers of electrocast refractories.

A decidedly interesting photograph of the Corhart furnace in action is shown on the first page of the booklet.

Recognizing the trend of the time and foreseeing the limits placed by nature upon the old methods of fabricating tank blocks, the laboratories behind the Corhart project developed the process by which Corhart Electrocast has been made available.

Although high fusion point and low porosity had always been considered a paradoxical condition for commercial purposes, the Corhart process does actually make commercially possible *a tank block with a fusion point of cone* 38 *and a porosity of less than* ½ of 1%. This is in contrast with a cone fusion point of 29 to 30 and a porosity of 22 to 26% —the average figures for blocks made by the old process. Furthermore, the body of the Corhart product is uniformly crystalline and of a physical nature suited to meet chemical corrosion under high temperatures.

It is this product, the advantages of which have been amply demonstrated in hundreds of glass furnaces throughout the world, that the Corhart Refractories Company offers to the glass industry under the trade name of Corhart Electrocast.

One of the photographs included in the booklet shows the Corhart blocks which were placed at the entrance jambs of a fourcoult canal, because of the rapid erosion at this point. It is evident that the Corhart blocks have been very little affected after a complete fire, whereas conventional material to the right and in other less severe locations has been badly corroded. This indicates clearly why Corhart Electrocast, when used throughout the furnace, prevents the phenomenon of stone-throwing, with all its tangible and intangible losses. Corhart engineers are available for the discussion of *your* furnace refractory problems. They will be glad to visit your office and frankly discuss these points and, without obligation, make recommendations that should be of interest and profit.

The New Deal Must Spread Over All Industry

Submitted by The Austin Company, Cleveland, Ohio.

The eagle of recovery is a two-winged bird. He can't soar to his natural altitude without a two-sided lift . . . *consumer goods* on one side and *capital goods* on the other. That's why it's not merely good business but also good patriotism to scrap obsolete equipment and replace old buildings.

Look at these figures—the capital goods industries slipped down to 33% of 1929 production; consumer goods slipped down to only 75%. How can one revive without the other?

Capital goods producers normally employ 8,000,000 men. Upon them the consumer goods industries must depend for purchasing power. In 1929, 40 billion dollars of durable goods were produced while the total volume of consumer goods was about 30 billion dollars.

The permanent success of all *consumer goods* plants—of textile mills and canneries, of shoe plants and candy factories, is definitely linked with the revival of the *capital goods* industries—companies engaged in the production of machines and machine tools, of electric furnaces and welding equipment, of packaging machinery and high speed elevators, of trucks and material handling equipment. Important in this group are all companies active in the construction and equipment of new plants and plant additions.

If you are a manufacturer of consumer goods, who see *a profit opportunity* in building a new plant, or in adding to an old one, or in replacing obsolete machinery, you should *take* it.

The most patriotic move any corporation can make today is to patronize the capital goods industry. More is at stake than your immediate profits, though it is right that you should have them; more, indeed, is at stake that the returned prosperity of that whole sector of industry which depends for existence upon the production of capital goods. The success of the New Deal is dependent upon it.

The New Deal depends upon the return to activity of steam shovels and dump-trucks, cranes and donkey engines, turret lathes and forming presses, and the busy micrometers of the machine and plant equipment manufacturers. The New Deal must spread over ALL industry!

There is a logical first step—whether your program points to the need of a warehouse building, a branch plant, a new steam plant, an assembly building, a complete new plant or even a small addition—call a reputable plant engineering organization to your aid. Get the outside view-point on your present layout and equipment—on all of the factors that have a bearing on your operating costs. Let these engineers inspect your plant and offer their suggestions. Then, when they have proved the wisdom of action—ACT!

Oil Marketed In Glass

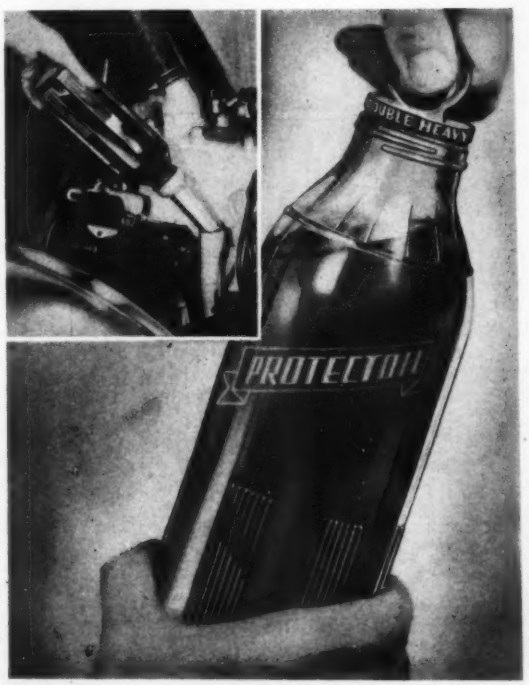
New Container Has Many Advantages In New Trend To Packaged Oil

Many of the prominent oil companies are now meeting the public demand for protected oil, and within the next year it is expected that practically all of the major oil distributors will be on the market with oil sealed in original packages, carefully identified as to brand and protected against contamination and substitution.

As a container for motor oil, glass has many exclusive advantages which make it the ideal package. The most important advantage of glass in the packaging of any product is that the consumer sees what he is buying. This feature is particularly valuable in attracting patronage to a good brand of motor oil, for even the layman can appreciate the clarity, color, consistency and absence of sediment in bottled oil.

The Owens-Illinois Glass Company, Toledo, has developed a bottle for packaged oil which has all the features of other types of sealed containers and which offers in addition the display advantage of clear and sparkling transparency. The bottle is provided with sealed metal closures which assure protection of contents against tampering. These seals are removed in the customer's presence, and the threaded top of the bottle permits a spout to be screwed into place for pouring the contents into the crank-case. As illustrated

(*Continued on page* 111)



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SMALL TOWN INDUSTRIES

SOME industries and commercial enterprises can only be carried on in a few locations, and they are sometimes sufficiently important to cause the growth of large cities in their environment. Thus shipbuilding can hardly be carried on effectively far from tidewater, and then only in the presence of a good harbor; and large towns tend to grow up on the relatively few good harbors of the world.

The automobile industry, calling, in this country at any rate, for mass production of comparatively expensive and intricate machines, has likewise resulted in a great concentration of population in a single city.

The glass industry, up to date, has been essentially a diffused industry. Mass production may be used, but as the product is relatively simple—a bottle, lamp bulb, or window pane, it can be carried on for the most part efficiently and effectively in small factories employing a few hundred men. Such an industry plays an important part in the national economy.

The factories do not need an enormous labor supply, and therefore can be, and for the most part are, located in small towns. The small town mind may be something of a joke, but the small town factory is not. It is in contact with the large cities for supplies and outlets, yet its operatives are in direct contact with the countryside and live in a more or less natural environment. Men have not yet solved the problem of living too far from the soil and remaining human.

During the recent orgy of mergers many small factories were bought out or combined into larger enterprises. This was very true in the glass industry. During a period of business contraction it was found economical to shut down some factories and concentrate the work at others. This, however good it might be for the immediate relief of the firm's balance sheet, was not good for the nation. The earning power of the shut down localities was completely broken: their producing power naturally collapsed, and after affecting its immediate environment, and local banks, the distress necessarily spread afield and in time was seen reflected in a decreased demand for the firm's plate glass or bottles.

Efforts are now being made to reopen a number of these smaller plants, which, if less efficient than some others, are able to survive perfectly well if not closed arbitrarily by out-of-town control. Thus, Brackenridge is seeking from Owens-Illinois the reopening of its local bottle plant, either by Owens-Illinois itself, or by the sale of the plant to local interests. Similarly, Blairsville is negotiating with General Motors for a lease or sale of the local Plate Glass plant. Hazel-Atlas, without outside pressure, but perhaps not entirely altruistically, has reopened a plant in Oklahoma which it had abandoned.

The problem of restoring prosperity to the farmer is very difficult. The problem of restoring prosperity to a great metropolis is too complicated for anyone to grasp. But the problem of restoring prosperity to the small towns may not be insuperable. The restoration of activity in the small town plants in place of its concentration in a few gigantic superfactories may help materially in the restoration of prosperity.

F. W. PRESTON.

Glass Container Freight Rates Greatly Reduced

Rates in effect since September 26, in all territories throughout the country

. . . I. C. C. decision cuts transport charges on virtually all glass-packed foods . . . Establishes complete parity with same products in tin . . . Reductions as high as 50 per cent . . . Railroads find glass container breakage negligible . . .

IN a decision of tremendous importance to packers of practically every known food product, the Interstate Commerce Commission has ruled for parity in freight rates on these products, whether they are packed in tin or glass. The decision, in Investigation and Suspension Docket No. 3569 (embracing also I. & S. Dockets 3803 and 3818) was rendered July 31, 1933, but was not made public until Aug. 23. In terms of dollars and cents to the food packer, it means a total reduction in freight on glass packed foods amounting to from 20 to as high as 54.5 per cent, and will save millions annually in freight charges. The new rates are now effective in all territories throughout the country.

Foods in glass will henceforth pay the same rate per hundred pounds as they would if packed in other types of containers. Packers who have hitherto hesitated to use glass on account of discrimination in freight charges, may now avail themselves of the superior sales advantages of this type of container. Railroads unanimously in favor of the lower rates, expect to benefit materially (1) by increased use of glass containers and consequently hauling of more glass packed foods, more empty containers and materials for the manufacture of containers;(2) by restoring to rail service a large less-than-carload business in glass packed foods now moving by truck.

To summarize the factors upon which the carriers sought the lower schedules, we refer to the report of the Commission:

"To justify the suspended schedules respondents (the railroads) assert that there is nothing incident to glass containers themselves nor the types of food with which they are packed that would warrant less-than-carload ratings on glass-packed goods in excess of those on goods packed in tin. Due to improvements in manufacturing processes, the present-day glass containers are quite sturdy as the tin containers. The claims which respondents pay for breakage of glass-packed goods are negligible. The foods packed in glass are of the same kind and quality as those packed in tin, but due to the fact that the glass containers cost less per pound than the foods with which they are packed and weigh more per unit than the tin containers, the value of glass-packed foods is less than that of tin-packed foods.

"That there is no transportation factor to justify the maintenance of higher ratings on these articles when packed in glass than when packed in tin is further evidenced by the fact that respondents maintain the same carload ratings on practically all of them, irrespective of whether they are packed in glass or metal containers.

Railroads (and they should know!) find glass containers as sturdy and reliable in transit as any type of package. Claims for breakage actually are negligible. There is no transportation problem that is especially peculiar to glass containers. And, from a rate-making standpoint, glass packed foods are worth less per shipping pound and thus certainly merit at least equal rates.

The Commission, in finding the proposed freight schedules justified, has apparently settled a question which has been at issue for more than 40 years. Since 1887, l.c.l. rates on all food products in glass have been from two to three classes higher than on the identical products packaged in metal. In the famous Indian Packing Company case, the Commission permitted a spread of not more than one class. As a matter of fact, under that decision the carriers could have established parity. They elected at that time, however, to establish a spread of one class; but when, in 1931, the railroads voluntary undertook to establish complete rate parity between glass and tin packed food products the Commission suspended the schedules for the purpose of investigating their propriety. Then, after hearings, the Commission found the schedules not justified. But this did not settle the fundamental question at stake. Subsequently, and as a result of efforts on the part of the Glass Container Association, the carriers virtually established parity by the publication of equal ratings in exceptions to the Official Classification.

These schedules also were suspended, but as a result of the further proceedings, the Commission has now reversed its former decisions and has accorded the relief which has been sought for many years. *Reprinted from The Glass Packer.*

(*Continued from page* 109)

by the lettering "Protectoil" the glass bottle can have permanent lettering attractively applied for brand and trademark identification.

The Owens-Illinois bottle not only provides excellent display of oil, protection against impurities, protection of brand reputation and conveniences in use, but also saves the oil distributing company much expense because this type of container can be returned from the filling stations repeatedly for re-use.

Correspondence

Editor, "Glass Industry",
New York, N. Y.
Dear Sir:

Just read your article on page 100 of the current issue concerning a French book on glass. You say "It is, so far as you know (that clause saves you) the first serious work on the subject in French." Mon Dieu, et Voila! About fifty years ago, I bought in London a book on this subject, the fly leaf of which reads as follows:

Le Verrier du XIXme Siecle
ou
enseignement theorique et pratique
de
L'Art de la Vitrification
Tel qu'il est pratique de nos jours
Comprenant la fabrication du verre a vitres, des cristaux, des boutelles, de la gobeleterie, des glaces, du verre pour optique, de la verroterie, du strass, des verres de couleur et filigranes.
traitant
de la peinture sur verre, des emaux, du soufflage a la lampe d'emailleur, etc.
Par Pierre Flamm

This book was published in 1860 and as you will perceive, covers pretty well every phase of glass making. Of course, it is now obsolete in many things; much chemical knowledge has accumulated since that time, but I frequently refer to it even now.

Pierre Flamm, peace to his ashes, is the only writer I have met who seems to combine the scientific and the practical; all other works that I have seen, seem to be the work of scientists without practical knowledge, or of practical men (very crude affairs) without science. His work stands alone in this respect.

About forty-eight years ago, I got the greatest thrill of my life from it. At that time, the highest pinnacle of fame, the very quintessence of achievement of the glass maker was to be able to make "ruby" and I made my first batch of this color, obtaining my instructions from its pages and using gold as a colorant.

Ten years later, I loaned it to an acquaintance of mine who was manager of a glass plant and from it he made the first rolled sheet ruby at that place and I think, the first in the country. These two achievements are sufficient, I think, to stamp "Le Verrier du XIXme Siecle" as a scientific book and as for practicalness of the author note the following from his preface and which I leave to the Editor to translate.

"Il n'est pas, que je sache, d'industrie plus herissee d'obstacles et dans l'exercice de laquelle on recontre plus de combinaisons avortees que dans la fabrication du verre."

Did he know things about glassmaking? I think every glassmaker, after reading the foregoing quotation will say with me "He most certainly knew his glass."

Yours very truly,
W. Blenko.

Mr. W. H. Blenko,
Blenko Glass Co.,
Milton, W. Va.

Dear Sir:

The Editor of GLASS INDUSTRY has sent on to me your letter of the 8th, which is of enough interest, I think, to warrant my asking that with your permission, he should publish it in the next issue of the Journal.

I am not sure that I know Pierre Flamm's book, and I should much like to see it. However, I am quite sure that it covers an entirely different field from Bernard Long's little treatise. In 1860 there was a well developed art of glassmaking. There was not, in the modern sense of the word, any considerable amount of science. The technique of glassmaking had reached a high standard, but there was no technology of consequence.

I do not think it would be possible for the Manager of the Kokomo Opalescent Company, even if he were French, to make ruby glass at the first stab as a result of looking over Bernard Long's book. This may mean of course, that such a work as Flamm's might be of much more use to him in a specific case than the work of Long. I do not think that any serious work on glass technology could have been written until within the last ten years, and a work written ten years ago would be a very thin and unsatisfactory treatise at the present time. I think it is generally true, as you say, that books on glassmaking are written either by theorists who know very little about the inside of a glass plant, or else by well meaning practical men, who are full of an immense accumulation of disconnected experiences and have no concept of any underlying principles. I am afraid this state of affairs will continue for some time, since the most competent men of the industry who work in the plants a great deal and follow the technological development closely, do not seem to have the time or disposition to attempt to write a book.

Meantime among such books as are available, even though they do not teach me exactly how to make ruby sheet, I place Bernard Long's book near the head of the list.

Since I wrote the review, M. Ingouf, General Manager of the Blue Ridge Glass Corporation, and President of the new Franklin Glass Corporation, has told me that Long's book is in his opinion the best thing that has appeared in French for a very long time, and I have also heard that a project is under way to translate it into English.

If you care to send me Flamm's treatise, I will read it at the earliest possible date and review it for GLASS INDUSTRY. A book that is nearing the seventy-five year mark, if it has value, which clearly it has from your account, may easily stand reviewing once more. The generation that originally reviewed it must by this time have passed entirely away.

Yours very truly,
F. W. Preston.

New Glass-Writing Ink is Perfected

Answering a long-felt need in the glass industry and in laboratory practice for a safe, harmless but practical glass-writing ink, the research laboratories of the Ceramic Division of Baltimore Paint & Color Works, Baltimore, Md. announce the perfection of such a product.

It can be applied to glass as easily as ink to paper. It adheres but doesn't smear. Yet it is as safe as water. It contains no hydro-fluoric acid and it doesn't etch the glass. It cannot burn for there is nothing in it to burn.

These are the claims made for this new ink, which is known as Re-Lin-Ink. It was developed by the same laboratories which produced Relinus, a new scientific protective coating for glass refractories. According to A. A. Shuger, general sales manager, the company had been asked on many occasions to experiment with a glass-writing ink. It took the company's research laboratories a year to develop it.

"The fundamental requirement", said Mr. Shuger, "was a safe ink. Instances of laboratory chemists and others in the glass industry being severely burned by the use of inks containing hydro-fluoric acid had been called to our attention. Often these burns took months to heal. The ink that our laboratories has created is harmless, durable and practical. A child could use it as safely as school paints."

Mr. Shuger said that his company would be glad to supply samples to those who wish to try the new glass-writing ink.

American Bottlers of Carbonated Beverages to Hold Convention

THE FIFTEENTH ANNUAL CONVENTION AND EXPOSITION of the AMERICAN BOTTLERS OF CARBONATED BEVERAGES will be held at the Jefferson County Armory, Louisville, Ky., October 9-13, 1933.

More than 100 manufacturers of beverage manufacturing supplies and equipment will have displays at the Exposition.

The program for the Convention Sessions includes a talk on the National Recovery Program by Donald R. Richberg, general counsel for the National Recovery Administration whose thorough information concerning the provisions of the National Industrial Recovery Act he helped to write, and his prominence in the Government's activities for putting it into effect, insure that members of the industry who hear his talk will profit immensly.

Mr. H. L. Derby, Jr. has been appointed Manager of the Chicago District of the American Cyanamid & Chemical Corporation with headquarters at 20 No. Wacker Drive, Chicago. The district embraces the territory west of the State of Ohio, extending to the Rocky Mountains.

"Coolite" is the name of the glass developed by the Mississippi Glass Company, to reduce the transmission of glare and heat, according to a report made at the convention of the Illuminating Engineering Society.

Heat Treatment of Glass

A paper published in the April number of the BUREAU OF STANDARDS JOURNAL OF RESEARCH shows some of the variations found in the heating curves of a glass when it is chilled or annealed in varying degrees. A discussion is included which is designed to explain the relation of these variations to certain assumed changes in the physiochemical condition of glass as its "effective" annealing temperature is varied. The relation which these changes in condition bear to the properties of a glass and to some phases of the problem of annealing is also considered. It is evident from both the experimental results and these discussions that annealing procedures may be so manipulated that certain properties of the glass may often be made either more desirable or more nearly coincident with standards of requirement than they would be if a fixed (or indefinite) annealing schedule were always followed for a given type of glass.

New Healthguard Mask

A new mask revolutionary in both design and efficiency has just been developed by the Chicago Eye Shield Company, 2300 Warren Blvd., Chicago, Illinois. The Mask known as the Style No. 601 HEALTHGUARD, is designed primarily for sand and shot blasting and other occupations where harmful dusts are encountered.

The mask consists of a soft molded rubber face piece, designed to adapt itself to any facial contour. When in position, the interior becomes sealed against outside air, preventing the entrance of dust particles. The face piece is held in position by a molded rubber head harness, fitted with detachable and adjustable buckles, permitting the mask to be slipped on or off the head in just a few seconds.

Attached to the side of the face piece is a molded flexible rubber tube, permitting free movement of the head. The lower end of the tube connects with the air filter which in turn is attached to an adjustable belt. A quick acting coupling connects the filter to the air supply.

Current Prices of Glass-Making Materials

as of September 21, 1933.

Quotations furnished by various producers, manufacturers and dealers

Acid		Carlots	Less Carlots
Citric (dom.)	lb.	...	.29
Hydrochloric (HCl) 20° tanks	Per 100 lb.	...	1.10
Hydrofluoric (HF) 60% (lead carboy)	lb.	...	.13½
52% and 48%	lb.	.10	.10-.11½
Nitric (HNO_3) 38° carboy ext.	Per 100 lb.	5.50	...
Sulphuric (H_2SO_4) 66° tank cars	ton	15.50	...
Tartaric	lb.	... Po. or Gr. / Cry.	.24 / .24½
Alcohol, denatured	gal.	...	...
Aluminum hydrate ($Al(OH)_3$)	lb.	.04-.04½	.05½-.06
Aluminum oxide (Al_2O_3)	lb.	.07	.09
Ammonium bifluoride (NH_4FHF)	lb.	...	15½
Ammonia water (NH_4OH) 26° drums	lb.	...	.02¾
Antimony, metallic (Sb)	lb.	.02½	.02¾
Antimony oxide (Sb_2O_3)	lb.	.08	.08½
Antimony sulphide (Sb_2S_3)	lb.	...	.08½
Arsenic trioxide (As_2O_3) (dense white) 99%	lb.	.04	.04½
Barium carbonate ($BaCO_3$), Crude, (Witherite) 90%, 99% through 200 mesh	ton	56.50	...
90% through 100 mesh	ton	44.00	...
Barium hydrate ($Ba(OH)_2$)	lb.	...	.05¾
Barium mixture, glassmaker's, f. o. b. St. Louis	ton	25.00	...
Barium nitrate ($Ba(NO_3)_2$)	lb.	...	.08
Barium selenite ($BaSeO_3$)	lb.	...	...
Barium sulphate, in bags	ton	19.00	24.00
Barium sulphate, glassmaker's, carlots, bulk f. o. b. shipping point	ton	15.00-16.00	18.00
Bone ash, carlots	lb.	.06	.06½
Borax ($Na_2B_4O_7·10H_2O$)	lb.	...	...
Granulated	In bags, lb.	.02	.02¼-.02½
Powdered	In bags, lb.	.02¼	.02½-.02¾
Boric acid (H_3BO_3)	In bags, lb.	.04¼	.04½-.04¾
Cadmium sulphide (CdS)— Red	lb.	...	.60-.75
Orange	lb.	...	.55-.65
Yellow	lb.	...	1.30-1.50
Chromium oxide (Cr_2O_3)	lb.	...	.18¾
Cobalt oxide (Co_2O_3) In bbls	lb.	...	1.15
In 10 lb. tins	lb.	...	1.25
Copper oxide Red (Cu_2O)	lb.	...	.25
Black (CuO)	lb.	...	.17-.19
Black prepared	lb.	...	.22
Cryolite (Na_3Al Fe) Natural Greenland (Kryolith)	lb.	.08½	.09
Synthetic (Artificial)	lb.	...	.08
Epsom salts ($MgSO_4$) (imported) technical	Per 100 lb.	...	2.40
Feldspar— 40 mesh	ton	10.00-11.50	
20 mesh	ton	10.00-11.50	
Granular	ton	10.00-12.50	
Semi-granular	ton	10.00-11.50	
L. C. L., (Min. 2 tons) $2.00 per ton additional plus charge for bags			
Fluorspar (CaF_2) domestic, ground, 96-98% (max SiO_2, 2½%) Bulk, carloads, f. o. b. mines	ton	30.00	...
In bags or barrels	ton	34.00	39.00
Imported	ton		
Formaldehyde	lb.	...	.07
Graphite (C)	lb.	...	.04-.07
Iron oxide— Red (Fe_2O_3)	lb.	...	.0425
Black (FeO)	lb.	.04½	...
Kaolin (f. o. b. mine)	ton	8.00-9.00	...
English, lump, f. o. b. New York	ton	14.50-25.00	24.50-30.00

Kryolith (see Cryolite)		Carlots	Less Carlots
Lead chromate ($PbCrO_4$)	lb.	...	.30
Lead oxide (Pb_3O_4) (red lead)	lb.	.070	.080
Litharge (PbO)	lb.	.060	.070
Lime— Hydrated ($Ca(OH)_2$) (in paper sacks)	ton	9.00	...
Burnt (CaO) ground, in bulk	ton	6.50	...
Burnt, ground, in paper sacks	ton	8.50	...
Burnt, ground, in 280 lb. bbls.	Per bbl.	2.15	2.30
Limestone ($CaCO_3$)		1.50-2.50	...
Magnesia (MgO)— Calcined, heavy (in bbls)	lb.	.06	.07
light (in bbls)	lb.	...	.23
extra light (in bbls.)	lb.	...	.37
Magnesium carbonate ($MgCO_3$)	lb.	.06	.10
Manganese 85% (MnO_2)	lb.	57.50	62.50
Nickel oxide (Ni_2O_3), black— for nickel content	lb.	...	.35
Nickel monoxide (NiO), green— for nickel content	lb.	...	.35
Plaster of Paris, bags	ton	31.00	23.00-29.00
Potassium bichromate ($K_2Cr_2O_7$)— Crystals	lb.	.07½	.08
Ground	lb.	.08	.08½
Potassium carbonate—94-96%	lb.	.076½	.0825
Calcined (K_2CO_3) 96-98%	lb.		
Hydrated 80-85%	lb.	.07	.075
Potassium chromate (K_2CrO_4)	lb.	...	.14½
Potassium hydrate (KOH) (caustic potash)	lb.	.07½	.08
Potassium nitrate (KNO_3) (gran.)	lb.	...	.06-.06¼
Potassium permanganate ($KMnO_4$)	lb.	.17½	.18
Powdered blue	lb.	...	.23
Rochelle salts, bbls	lb.	...	.12½
Rouge	lb.	... Po. or Gr. / Cry.	.13½
Rutile (TiO_2) powdered, 95%	lb.	.15-.20	.20-.25
Salt cake, glassmakers (Na_2SO_4)	ton	18.00	...
Selenium (Se)	lb.	...	1.70
Silver nitrate (AgNO)	(100 oz.) per oz.	...	.30
Soda ash (Na_2CO_3) dense, 58%— Bulk on contract	Flat per 100 lb.	1.05	...
Flowers, in bags	Per 100 lb.	1.38	...
In bags	Per 100 lb.	1.17½	...
Spot orders	.025 per 100 lbs. higher	...	...
Sodium bichromate ($Na_2Cr_2O_7$)	lb.	.05	.05½
Sodium hydrate (NaOH) (caustic soda) Solid	Per 100 lb.	2.50	...
Sodium nitrate ($NaNO_3$)— Refined (gran.) in bbls	lb.	...	3.62
95 per cent	Per 100 lb.	1.195-1.295	1.245-1.345
Sodium selenite (Na_2SeO_3)	lb.	...	2.00
Sodium fluosilicate (Na_2SiF_6)	lb.	.04½	.05-.06
Sodium uranate (Na_2UO_4) Yellow or Orange	lb.	...	1.40-1.45
Sulphur (S)— Flowers, in bbls	Per 100 lb.	3.45	3.70-4.05
Flowers, in bags	Per 100 lb.	3.10	3.35-3.65
Flour, heavy, in bbls	Per 100 lb.	2.85	3.20-3.45
Tin chloride ($SnCl_2$) (crystals)	lb.	.35½	.36
Tin oxide (SnO_2) in bbls	lb.	...	.50
Uranium oxide (UO_2) (black, 96% U_3O_8) 100 lb. lots. Black	lb.	...	2.75
Yellow orange	lb.	...	1.40
Zinc oxide (ZnO)	lb.	.08½	.12
American process, Bags	lb.	.05¾	.06
Zircon Granular (Milled .005-.02c higher)		.07	.67½-.08
Crude, Gran. (Milled .005-.02c higher)		.03½	.04-.05

Miller Machine Purchases Lynch Corp.

The recent purchase of the Miller Machine & Mold Works, Columbus, Ohio, by the Lynch Corporation, Anderson, Ind., included their mold business. In order to devote their entire time and attention to the manufacture of forming machines, the latter company decided to sell the mold business to an exclusive mold manufacturer. Accordingly, they disposed of the drawings, patterns, special tools, etc., pertaining to the manufacture of molds, to the Overmyer Mold Company, of Winchester, Ind.

The Overmyer Mold Company operate the largest shop devoted exclusively to the manufacture of molds and have had many years experience in designing and building molds for both the Lynch and Miller type machines. Their plant is modern and well equipped and it is assured that in disposing of the mold business to them customers' interests will be best served.

Unfilled orders for molds have been turned over to the Overmyer Mold Company and all future inquiries and orders for molds should be sent direct to them.

GLASS DIVISION SUMMER MEETING at Cook Forest, Pennsylvania, will be held over the week-end of September 29.

A. V. HOFBAUER & SONS GLASS CO., Millville, N. J. has been organized by A. V. Hofbauer and associates. Operations at first will be on a small scale, to be increased later.

August Plate Glass Production

The total production of polished plate glass by the member companies of the Plate Glass Manufacturers of America, as reported by Secretary P. A. Hughes, for the month of August 1933 was 11,326,618 sq. ft., as compared to 11,350,393 sq. ft. produced by the same companies in the preceding month, July 1933. This makes a total of 60,803,359 sq. ft. produced by the Association members in the first eight months of 1933.

August Construction

August construction contracts totaled $106,131,100, a gain of about 28 percent over July and was the largest monthly total thus far reported for 1933. For the elapsed eight months of 1933 contracts totaled $620,937,600 as against $929,836,500 for the corresponding eight months of 1932.

LINK-BELT models K-38, 44 and 55 are covered in three eight-page 8½ x 11" folders recently issued by the Link-Belt Company, 300 West Pershing Road, Chicago, Ill., on Crawler-Mounted Shovel, Crane, Dragline Equipment. Lifting capacities, clearance diagrams and other data are given. Copies will be mailed upon request.

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The Glass Industry Classified Buyers' Guide

FOR FURTHER INFORMATION, SEE ALPHABETICAL DIRECTORY OF ADVERTISERS AND CONSULT ADVERTISEMENTS

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Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

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Dixon, H. L., Co., Box 140, Pittsburgh, Pa.

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Dixon, H. L., Co., Pittsburgh, Pa.

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Sharp-Schurtz Company, Lancaster, O.
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(See also Bond, Clay, Fire and Furnace Clay)
Pittsburgh Plate Glass Co., Refractories Dept., Pittsburgh, Pa.

CLAY POTS
Pittsburgh Plate Glass Co., Refractories Dept., Pittsburgh, Pa.

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Toledo Engineering Co., Inc., Toledo, O.

Mechanical
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Amsler-Morton Company, The, Pittsburgh, Pa.
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Amsler-Morton Company, The, Pittsburgh, Pa.
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Dixon, H. L., Co., Box 140, Pittsburgh, Pa.
Wilson-Maeulen Pyrometer Division, The Foxboro Co., Foxboro, Mass.

PYROMETER TUBES
Dixon, H. L., Co., Box 140, Pittsburgh, Pa.
Wilson-Maeulen Pyrometer Division, The Foxboro Co., Foxboro, Mass.

REFRACTORIES (See also Fire Brick)
Glass House
Amsler-Morton Company, The, Pittsburgh, Pa.
Corhart Refractories Co., Louisville, Ky.
Dixon, H. L., Co., Box 140, Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Pittsburgh Plate Glass Co., Refractories Dept., Pittsburgh, Pa.

REVERSING VALVES, GAS AND AIR
Amsler-Morton Company, The, Pittsburgh, Pa.
Dixon, H. L., Co., Box 140, Pittsburgh, Pa.

SALT CAKE
Drakenfeld, B. F., & Co., Inc., New York.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

SELENIUM
Drakenfeld, B. F., & Co., Inc., New York.

SHEET METAL WORK
The Kirk & Blum Mfg. Co., Cincinnati, O.

SODA ASH
Solvay Sales Corporation, Syracuse, N. Y.

SODIUM SELENITE
Drakenfeld, B. F., & Co., Inc., New York.

STORAGE BINS, RAW MATERIALS (See also Coal Handling and Storage Systems, and Batch Handling and Mixing Systems)
Amsler-Morton Company, The, Pittsburgh, Pa.
Dixon, H. L., Co., Box 140, Pittsburgh, Pa.

TANK BLOCKS
Amsler-Morton Company, The, Pittsburgh, Pa.
Corhart Refractories Co., Louisville, Ky.
Dixon, H. L., Co., Box 140, Pittsburgh, Pa.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Pittsburgh Plate Glass Co., Refractories Dept., Pittsburgh, Pa.

TANK FURNACES (See Furnaces)

URANIUM OXIDE
Drakenfeld, B. F., & Co., Inc., New York.

VENTILATING SYSTEMS
The Kirk & Blum Mfg. Co., Cincinnati, O.

WASTE HEAT RECLAIMING SYSTEMS
The Kirk & Blum Mfg. Co., Cincinnati, O.

WIND AND VENTILATING SYSTEMS
The Kirk & Blum Mfg. Co., Cincinnati, O.

ZINC OXIDE
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